TM 11-6625-320-35

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

FIELD AND DEPOT MAINTENANCE MANUAL

VOLTMETER METER ME-30A/U AND VOLTMETERS, ELECTRONIC ME-30B/U AND ME-30C/U

This reprint includes all changes in effect at the time of publication; changes 2 and 3.

HEADQUARTERS, DEPARTMENT OF THE ARMY

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Technical Manual
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HEADQUARTERS,
DEPARTMENT OF THE ARMY
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VOLTMETER, METER ME-30A/U AND VOLTMETERS, ELECTRONIC ME-30B/U AND ME-30C/U

*This manual together with TM 11-6625-320-12, 21 June 1960, supersedes TM 11-5132, 16 October 1957; C1, 8 April 1958; C2, 26 August 1958; C3, 9 January 1959; C4, 10 December 1959.

CHAPTER 1

THEORY

Section I. GENERAL

1. Scope

a. This manual covers field and depot maintenance for Voltmeter, Meter ME-30A/U and Voltmeters, Electronic ME-30B/U and ME-30C/U. It includes instructions appropriate to fourth and fifth echelons for troubleshooting, testing, calibrating, and repairing the equipment; replacing maintenance parts and repairing specified maintenance parts. It also lists tools, materials, and test equipment for fourth and fifth echelon maintenance. Detailed functions of the equipment are covered in the theory section.

b. The complete technical manual for this equipment includes TM 11-6625-320-12, TM 11-6625-320-12P, and TM 11-6625-320-35P.

c. In this manual, when reference is to all three models, the word voltmeter will be used. Specific models will be referred to as ME-30A/U, ME-30B/U, and ME-30C/U.

d. Forward comments concerning this manual to the Commanding Officer, U. S. Army Signal Materiel Support Agency, AT TN: SIGMS-PA2d, Fort Monmouth, N. J.

Note. For applicable forms and records, see paragraph 2, TM 11-6625-320-12.

2. Internal Differences in Models

Internal differences are listed in the chart below. For external differences and other internal differences see TM 11-6625-320-12.

Item[a]	ME-30A/U	ME-30B/U	ME-30C/U
Chassis mounting position to front panel.	Vertical.	Horizontal.	Vertical.
Tube and component locations.	Similar to ME-30C/U.	Unlike ME-30A/U or ME-30C/U.	Similar to ME-30A/U.
Designation of resistors and capacitors.	Unlike ME-30B/U or ME-30C/U.	Similar to ME-30C/U.	Similar to ME-30B/U.
T1 terminal designations.	Unlike ME-30B/U or ME-30C/U.	Similar to ME-30C/U.	Similar to ME-30B/U.
Value differences of resistors and capacitors in electrical circuitry.	None.	C33, 100 uuf.	C33, 33-510 uuf.
	C34, 500 uf.	C34, 500 uf.	C34, 1,000 uf.
	C30C, 20 uf.	C37, 40 uf.	C37, 40 uf.
	C16, 7-45 uuf.	C14, 5-80 uuf.	C14, 5-80 uuf.
	C14, 7-45 uuf.	C16, 5-80 uuf.	C16, 5-80 uuf.
	None.	R22, 4,700 ohms.	R22, 4,700 to 9,100 ohms.
	C19, .033 uf.	C21, .033 uf.	C21, .051 uf.
	C21, 7-45 uuf.	C22, 25-280 uuf.	C22, 25-280 uuf.
	R12, 27 ohms.	R12, 100 ohms.	R12, 47 ohms.
	R13, 150 ohms.	R13, 15 ohms.	R13, 15 ohms.
	R6A, R6B, and R6C. (See note 4 and 6, fig. 45.)	R6 and R6A. (See note 4 and 6, fig. 47.)	R6A, R6B, R6C, R6D, and C5A. (See note 6 and 8, fig. 49.)
	C6, 9-180 uuf.	C6, 5-80 uuf.	None.
	L1, 19 uh.	None.	None.
	C28, 8,200 uuf.	C31, 8,200 uuf.	C31, 9, 100 uuf.

Item[a]	ME–30A/U	ME–30B/U	ME–30C/U
Terminal numberings of switch S1B (front).	Unlike ME-30B/U or ME-30C/U.	Same as ME-30C/U.	Same as ME-30B/U
Terminal numberings of switch S1B (rear), (S1B (front) on ME-30A/U).	Unlike ME-30B/U or ME-30C/U.	Same as ME-30C/U.	Same as ME-30B/U.
Terminal board locations. All three models use different terminal board designations and vary as to the mounted components.	Similar to ME-30C/U.	Unlike ME-30A/U or ME-30C/U.	Similar to ME-30A/U.
Terminal numberings of switch S1A (rear).	Unlike ME-30B/U. or ME-30C/U.	Same as ME-30C/U.	Same as ME-30B/U.

[a]Other differences consist of equivalent capacitors and resistors of the same values in all models but are identified by different reference designations (fig. 46, 48, and 50).

Section II. UNIT THEORY

3. Block Diagram Analysis, Amplifier Section

a. General (fig. 1).

(1) The voltmeter is a measuring device for alternating current (ac) signals over a broad band of frequencies. The calibration of the meter permits expression of the magnitude of these signals in terms of voltage, decibels (db), or decibels referred to 1 milliwatt in 600 ohms (dbm). It is also used as an ac voltage amplifier over a broad band of frequencies for low level signals. Signal paths are shown in the block diagram (fig. 1) and discussed in paragraphs 3 and 4. For complete circuit details, refer to the overall schematics (fig. 46, 48, and 50) and stage analysis in paragraphs 5 through 11.

(2) Amplification of the signal voltage is provided by four stages which comprise a degenerative-type amplifier (tubes V2-V5). The four stages provide a net gain of approximately 55 to 60 db over the rated frequency band of the voltmeter. Frequency compensating networks in the plate circuit of each stage and in the coupling between stages, and cathode degeneration at low frequencies provide an extremely stable amplifier over the wide frequency band of 10 cycles per second (cps) to 4 megacycles (mc).

(3) Frequency response of the amplifier stages with respect to tube transconductance (mutual conductance) (g_m) and line voltage variations results in relatively constant amplification.

(a) In A, figure 2, the relative response of the amplifier stages is plotted against frequency for several g_m values with constant line voltage. As indicated by these curves, the frequent y response of the amplifier stages is largely independent of tube aging and the difference in g_m values between original and replacement tubes.

(b) In B, figure 2, the relative response of the amplifier stages is plotted against frequency for several values of line voltage. As indicated by these curves, changes of approximately 10 percent in line voltages have a negligible effect on the frequency response of the amplifier.

b. Input Voltage Divider. The input signal is applied to the input voltage divider through the INPUT binding posts. The purpose of the input voltage divider, which consists of a switch and a resistive and capacitive network, is to attenuate the signal by a ratio of 1,000 to 1 when any one